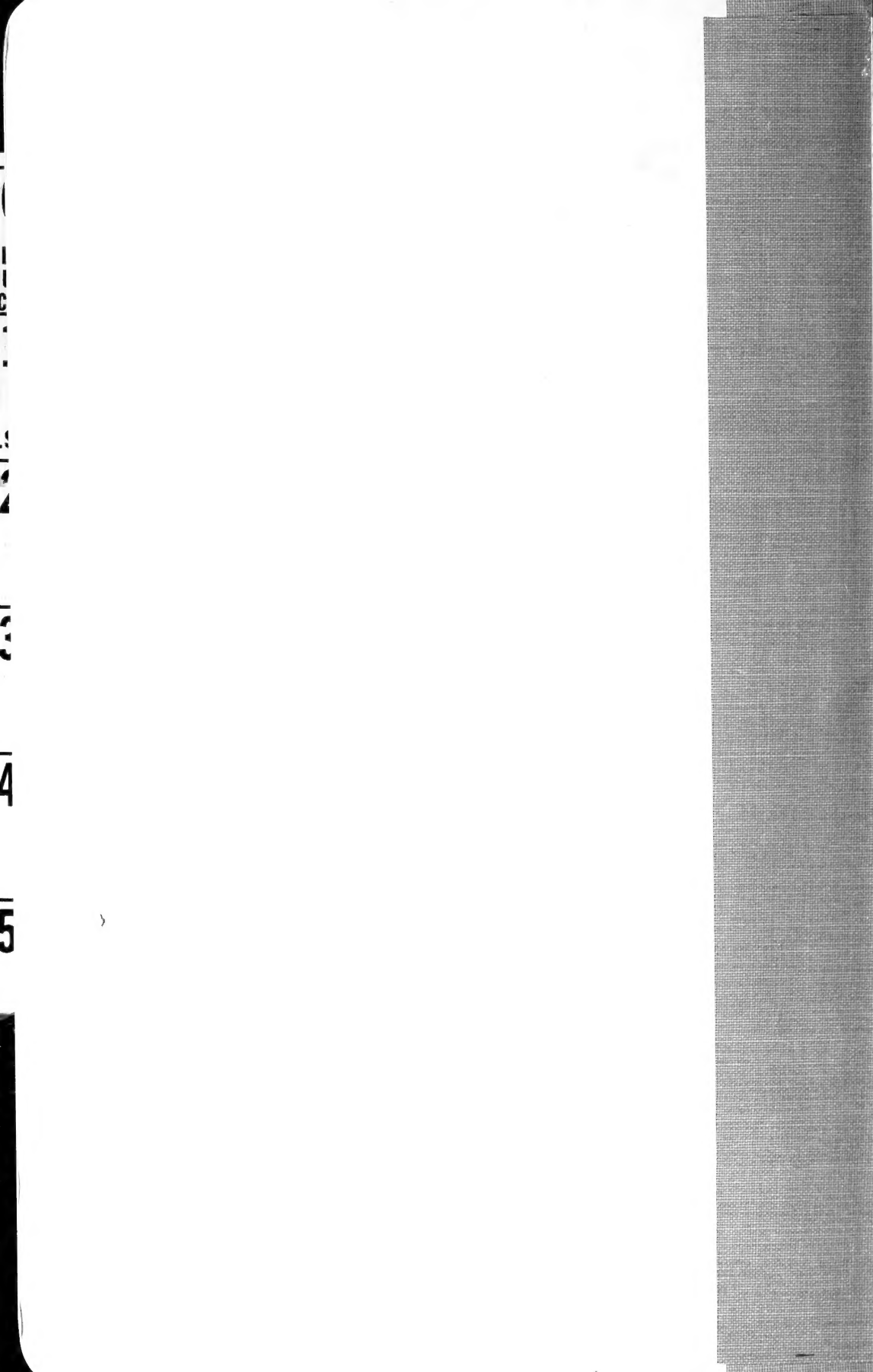


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The poisonous plants of New Jersey





THE POISONOUS PLANTS OF NEW JERSEY

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The Poisonous Plants of New Jersey.

BY BYRON D. HALSTED.

Since the Department of Botany was established in the Experiment Station, ten years ago, there have been, from time to time, inquiries made concerning many plants that are considered, or alleged to be, poisonous. In only two instances* has this subject received any consideration in the annual reports, and therefore the present purpose is to bring to the people of New Jersey a general statement of the poisonous plants growing naturally or cultivated within the State.

The number of persons who are annually more or less injured by the toxic properties of plants is considerable, while the deaths from the same causes are not a few. In 1896, for example, there was a fatal case within a dozen miles of the Experiment Station. Four children, returning from school, mistook water hemlock roots recently unearthed for those of some edible plant. After reaching home, one of the children became dizzy, nauseated, went into convulsions, and soon died. The other three children experienced a similar poisoning, but were finally restored to health.

In October last an investigation was made of a case of fatal poisoning in Newark, where a boy of five years had eaten freely of the half-grown capsules of the common thornapple (*Datura Stramonium* L.) in the afternoon, and, with all the usual characteristics of stramonium poisoning, the child died early the next morning.

*"Poisonous Plants in New Jersey—A Preliminary Report." In annual report for 1894, pages 401-419, and 1895, pages 351-355.

The reports of poisoning from the eating of toadstools are not infrequent, especially among recent immigrants, who let their fondness for this class of plants get the better of their insufficient knowledge. A very distressing instance occurred at Trenton in October last, where a family of eight persons partook freely of *Amanita phalloides* (L.), one of the most poisonous of the species of toadstools. Forty hours after the "mushroom" supper the miseries of two of the victims were terminated by death, and of a third four hours later. The other five members, after a long illness and with the almost constant attention of physicians and trained nurses, were restored.

In the following pages the poisonous plants of the State will be considered according to the brief outline that is given below :

- I. Plants poisonous when eaten (or juices taken internally).
 1. To the human species—
 - a. Flowering plants.
 - b. Flowerless plants.
 2. To live stock (animals other than the human)—
 - a. Flowering plants.
 - b. Flowerless plants.
- II. Plants poisonous by contact (or proximity).
 1. To the human species.
 2. To live stock, etc.

The various species are considered somewhat in the order of their toxic value, regarding, at the same time, family relationships. This arrangement will place the parsley group at the head of the list, and in this the water hemlock leads all others.

The Water Hemlock.

The water hemlock (*Cicuta maculata* L.) is the most poisonous plant in the flora of the United States, and has probably destroyed more human lives than all our other toxic plants combined. As a member of the parsley family (Umbelliferæ), it resembles in general appearance the carrot and parsnip of the same group of plants. A much-branched, tall perennial, with hollow stems, white flowers and dissected leaves, it grows commonly in swampy land throughout the eastern United States and, to some extent, as far west as the Rocky Mountains.

Portions of the cicuta are shown in Figure 1 (Plate I.),* where the compound leaves, small flowers in large umbels, the cluster of fleshy roots, the hollow stem and other details are to be seen. The whole plant is pervaded with an aromatic oil that is most abundant in the spindle-shaped roots, one to three inches long, arranged in a cluster at the base of the stem. The poisoning of the human is chiefly with these fleshy roots, and in the springtime when children, in particular, are in the habit of roaming over the fields and swamps, and with their appetite sharpened by the dry foods of winter, are ready to eat any succulent green stems or roots. In 1896 in New Jersey alone there were at least two quadruple cases of children poisoned by this water hemlock, resulting in two deaths. In these cases, as is usual, the roots had been unearthed by ditchers and left exposed, to attract the eye and tempt the appetite of children. Words of caution should be addressed to those who leave these roots in sight in earth thrown from trenches, and to parents and teachers, for children are apt to eat the juicy roots if at hand and no warning has been given them.

The active principle of this cicuta is the volatile alkaloid conine, common also to the poison hemlock (*Conium maculatum* L.), to be considered later, and probably also to a resinous substance, cicutoxine. The symptoms of the poisoning are many, including violent contraction of muscles, dilated pupils, vomiting, diarrhoea and epilepsy. Cases of suspected poisoning should always be placed in the hands of skilled physicians, and they are never more needed than when the cicuta is the cause. No antidote for conine-poisoning is known, and therefore the treatment must be largely the speedy removal of the toxic principle from the digestive system by use of stomach-pump and emetics.

Growing abundantly as does this plant in the lowlands, its eradication is difficult, and therefore there is all the greater need of knowing the appearance and poisonous nature of the plant. Everyone should refrain from eating swamp roots, and, in fact, those of any locality unless certain that they are harmless. If a low pasture contains the poisonous plant, it may be well to eradicate it by pulling the roots.

Other common names for the water hemlock (*Conium maculatum* L.) are "cowbane," "spotted hemlock," "spotted parsley," "beaver poison," "musquash root," "muskrat weed," and "wild parsnip."

*The photographs from which the four plates in this bulletin were made are taken from the excellent list of pictures of poisonous and medicinal plants made by Dr. C. L. Lochman.

Poison Hemlock.

(*Conium maculatum* L.)

This is a European plant that has become naturalized in waste places throughout the Eastern States in particular, but to some extent South and West. It is, like the previous species, a member of the parsley family, but is distinguished from the cicuta by many minor differences. The hollow, smooth stem bears large parsley-like leaves, which, when bruised, have a mousy odor and very unpleasant taste. In Figure 2 (Plate I.) is shown a portion of the conium plant with its very large, much-compounded leaves by which it is easily distinguished from the cicuta placed alongside of it in the plate.

The active conine pervades the whole plant, and was the poison employed by the Greeks in putting prisoners to death, Socrates being one of its illustrious victims. Of recent date the cases of fatal poisoning by the conium are not numerous, but its seeds when mistaken for anise have produced sad effects. The roots are nearly harmless during the spring months, when there is the most likelihood of children or others eating them, but later become very poisonous.

As with cicuta, the victim needs the prompt assistance of the physician, who may effect speedy removal of the poison from the digestive tract and administer subcutaneous injections of atropine, as recommended by Mr. Chesnut.*

It would not be a difficult matter to eradicate this plant in the ordinary way for weeds generally.

Some of the local names for this dreaded plant (*Conium maculatum* L.) are "poison snakeweed," "wode whistle," "poison root," "stinkweed" and "wild hemlock." Nearly the same list of names is used for this as for the cicuta previously considered.

Wild Parsnip.

There have been many fatal cases of poisoning charged to the wild parsnip (*Pastinaca sativa* L.), which is the same species as the one under cultivation and grows wild as a tall, coarse-leaved plant in waste places quite generally. The thorough investigation of several such cases have all resulted in fixing the toxic effects upon some other species that had been eaten along with or instead of the parsnip, usually the water hemlock. A full consideration of this subject is

* "Principal Poisonous Plants of the United States," by V. K. Chesnut, Bulletin No. 20, United States Department of Agriculture, Division of Botany.



FIG. 1.

The Water Hemlock (*Cicuta maculata* L.)



FIG. 2.

The Poison Hemlock (*Conium maculatum* L.)



Fig. 3.
The Thornapple (*Datura Stramonium* L.)



Fig. 4.
The Black Nightshade (*Solanum nigrum* L.)

given by Professor Pammel,* who shows that the various attempts upon the part of experts to detect a poisonous principle in the wild parsnip have failed.

The Thornapples.

The potato family (Solanaceæ) contains several kinds of poisonous plants. Two of these are the thornapples, namely, *Datura Stramonium* L. and *Datura Tatula* L., both stout, much-branched, large-leaved, ill-smelling annual plants, producing enormous trumpet-like flowers, followed by spinose fruits, bearing many dark seeds. Figure 3 (Plate II.) shows a small portion of a branch of the first-named species, with two of the large blossoms and one seed capsule in position and another in sectional view with the seeds exposed to sight. The *Datura Tatula* has purple blossoms and dark stems, instead of white blossoms and green stems, in the *D. Stramonium*.

Both species grow nearly everywhere in the State in neglected waste land, and abound in all parts, but particularly the seeds, in atropine (the antidote for the "fly toadstool," considered later) and hyoscyamine. These are very active poisons, the symptoms of which are headache, thirst, and convulsions that may end in death.

Children are usually the ones who are poisoned by the *Daturas* by eating the green capsules and the seeds they contain, that have an agreeable taste, or by chewing the great blossoms. A case of this kind is mentioned in the introduction to this bulletin, where the child died from eating possibly not more than one green fruit. Whenever the symptoms suggest datura poisoning the physician should be summoned at once and emetics administered, followed by frequent doses of morphia from the hands of the skillful practitioner.

With this and all other vegetable poisons, the first thing is to relieve the victim of the material that has been swallowed and place the case under the watchful care of those who know best how to counteract the poison by proper antidotes.

The *daturas* are large and well-known, unsightly weeds, and as such should not be permitted to grow around dwellings or in the vacant lots in cities. That they are positively dangerous in a settled fact, and this should be sufficient to warrant their destruction by the property-owners or those most interested in the eradication of the deadly plants.

There are many names for these *daturas*, some of them more or

*"Poisoning from Cowbane: Is the Cultivated Parsnip Running Wild Poisonous?" Bulletin No. 28, Iowa Experiment Station 1895.

less local, as "Jamestown weed," "jimson weed," "stink wort" and "stinkweed," but perhaps the most common, other than the thornapple, is "stramonium" or "datura."

There are some ornamental thornapples, notably *Datura meteloides* DC., a species with very large flowers, and it should be considered as having the same properties as the other daturas.

Poisonous Solanums.

The black nightshade (*Solanum nigrum* L.) is an annual herb with clusters of white flowers, followed by black, round berries. The general appearance of the plant may be gained from Figure 4 (Plate II.) It is frequently met with in shady, rich ground, and has the narcotic poisonous principle solanine (a crystalline compound) in all its parts, although usually in small quantities, and serious cases of poisoning are rare.

The berries are not very poisonous, but should be avoided, especially by children. As a general rule, wild berries and pulpy fruits should not be eaten unless they are known to be harmless.

The bitter-sweet (*Solanum dulcamara* L.) is a perennial climbing plant, quite closely related to the nightshade, and like it, abounds in solanine, but differs in having the berries in larger clusters and of an attractively-red color. It grows in moist, shady places, as along water-courses and rich waste land generally throughout the State. This species only occasionally produces ill effects, and is one of the kinds of plants with bright berries which should not be eaten.

The potato plant of the cultivated field contains the same poisonous principle, solanine, which sometimes develops in considerable quantity in the tubers when exposed to the sun and have become green. Such tubers may cause sickness and death, and should be avoided as poisonous.

The Poke Root.

The poke or scoke (*Phytolacca decandra* L.), in a small family (Phytolaccaceæ), possesses roots of marked toxic qualities and is somewhat poisonous in all parts. The plant is a common one throughout the State, and is attractive in all its stages of growth from the first succulent shoot in spring until the bright berries, full of purple "ink," borne upon large, bushy plants several feet in height, fall from their colored places of attachment in late autumn. The poison is phytolaccine, that may be extracted in the form of silky needles and causes vomiting, spasms of the muscles and possibly death.

The danger with this plant, as with nearly all of its class, is in the careless eating of its roots by children, who most frequently find them exposed near some excavation. The root itself is quite different in structure from those of most poisonous plants in having the tissues arranged in circles like those of the beet root. Portions of the poke root plant are shown in Figure 5 (Plate III.) The small flowers are regularly arranged in long pendent clusters, followed by the berries. The concentric rings in the root are seen in the section shown at the right and lower corner of the figure.

Lobelias.—The lobelias, of which we have three, are all more or less poisonous. The cardinal flower (*Lobelia cardinalis* L.) is the most conspicuous on account of its tall spike of red flowers, while the large lobelia (*Lobelia syphilitica* L.) has handsome blue blossoms. Both grow in low ground and flower in late summer. The Indian tobacco (*Lobelia inflata* L.) is common in New Jersey, and yields an irritant narcotic poison. The stomach-pump should be used, and strychnine is sometimes administered hypodermically, by the skilled physician.

False Hellebore.—Some cases have been known of young plants of *Veratrum viride* Ait. (considered elsewhere) being used for greens with sad results. The rule should be observed of including nothing as pot herbs that are not well known. The roots are quite poisonous.

Bouncing Bet.—The bouncing bet (*Saponaria officinalis* L.), a common weed, contains a poisonous principle, saponin, similar to its cousin, the corn-cockle, mentioned particularly under the head of "Plants Poisonous to Live Stock."

Poisonous Fruits, Seeds and Flowers.

Fruits.—The attractive berries of the bitter-sweet, black nightshade, buckthorn, poke, baneberry, leather-wood, yew, juniper, red elderberry, privet, English ivy, wahoo and daphne are to be avoided. It is seen from this list that it is not safe for persons to eat the fruits of plants indiscriminately, but instead they should refrain from them, no matter how attractive to the eye, unless known to be harmless.

In like manner, the large green capsules of the thornapples are not to be eaten, and the same is true of the pods of the coffee tree (*Gymnocladus dioica* L.) Suspicions rest upon the fruits of belladonna, henbane, various spuries and goosefoot.

Seeds.—Some seeds are poisonous, as those of the thornapples mentioned under "Fruits," corn-cockle, treated elsewhere, and the castor-oil plant (*Ricinus communis* L.), cultivated for ornament, the seeds of which are large and attractively marked and liable to do

injury to children. The common horsechestnut (*Æsculus Hippocastanum* L.) has poisonous qualities in the large seeds, but is exceeded in this by the red buckeye (*Æsculus pavia* L.), a shrub occasionally grown for ornament in the State. The bruised seeds of the latter are placed in ponds to stupefy fish. The seeds of black cherry, foxglove, saffron and mullein are more or less poisonous.

Flowers.—The following flowers have been proved, or at least are suspected, of being poisonous, thornapple, laurel, stagger bush, elder, locust and lily of the valley, and may be most effective as such through the toxic honey gathered from the blossoms. Many flowers are offensive and sickening, as wistaria, but the list would be extensive if it included all those that affected some persons unpleasantly. The strawberry is a violent poison to a few individuals !

Wild Plants With Somewhat Poisonous Underground Parts.

There are several plants, the fresh roots of which when eaten have poisonous properties, as the Black Cohosh (*Cimicifuga racemosa* L.) ; Baneberry (*Actæa alba* L.), and the red species (*Actæa rubra* Ait.) ; Meadow Rue (*Thalictrum* Sp.) ; Locust (*Robinia viscosa* Vent.) ; Culver's Root (*Leptandra Virginica* L.) ; Horse Gentian (*Triosteum perfoliatum* L.) ; Birthwort (*Trillium erectum* L.) ; Dogbane (*Apocynum cannabinum* L.) ; Man-of-the-ground (*Ipomœa pandurata* L.) ; False Ipecac (*Euphorbia Ipecacuanhæ* L.) ; Jack-in-the-pulpit or Indian Turnip (*Arisæma triphyllum* L.) ; Horseradish (*Roripa Armoracia* Fries.) ; Bloodroot (*Sanguinaria Canadensis* L.) ; Mandrake (*Podophyllum peltatum* L.) ; Blue Flag (*Iris versicolor* L.)

All of the above are named by Dr. Rusby* as toxic, but not especially dangerous because of the acidity or otherwise repugnant taste, and ill results usually obtain only when children are overcome by romantic notions or downright hunger. Those who have experienced the taste of the Indian turnip will realize that its acidity is the best safeguard against its being a source of serious danger. The list as above named is seen to be a long one, and parents should make it emphatic that children are not to eat roots they may find wild in fields and woods.

The lily of the valley (*Convallaria majalis* L.) is one of the garden ornamental plants, the bulbs of which have a sweet taste and are poisonous, and to the list may be added the tulip, crown imperial, narcissus, saffron, snowdrop, and amaryllis, and the corms of cyclamen and roots of violets.

* "The Poisonous Plants of the Vicinity of New York City."

Poisonous Herbage.

The plants that lead in the toxic qualities of their herbage are aconite, tobacco, veratrum, thornapples, tansy and the water hemlocks, but the following are more or less poisonous: Crowfoots, clematis, cherry, lobelias, hyoseyamus, atropa, bitter-sweet, belladonna, laurels, staggerbush and nasturtium.

It is seen from the above that there are underground parts of many plants with toxic properties, several berries unfit for food, while the herbage and bark of some plants are poisonous. It follows, therefore, that a general rule may be laid down, namely, all parts of all plants not known to be harmless should be tasted with caution and never eaten in any quantity.

Poisonous Toadstools.

The number of kinds of very poisonous toadstools is small, and in Professor Peck's recent work,* from which Figures 6 and 7 are taken, is reduced to three, all of which are members of the genus *Amanita*, namely, *Amanita muscaria* (L.), *A. phalloides* (L.) and *A. verna* Bull. These are not usually poisonous to the touch, but may prove fatal when used as food, and demand our consideration.

The *Amanita muscaria* (L.) is, as its Latin name suggests, the fly amanita or fly toadstool, so called because the juice of the plant is fatal to some insects, and has long been used to destroy the common house fly (*Musca domestica*).

This is our most common, cosmopolitan, poisonous toadstool, growing in woodland, especially under evergreen trees, and sometimes in the open pastures, being found at nearly all weeks in the growing-season after the first of June. This species is the one which caused the death of Count de Vecchi, at Washington, D. C., in November, 1897.

On account of the large size and highly-colored yellow, orange or scarlet cap, flecked with white, the species is easily recognized. The white or yellowish-white stalk, four to six inches long, somewhat woolly or scaly below, rises from a gradually-widening, bulbous, rough base, and an incomplete vulva or cup. The cap is three to eight inches broad, with white gills, slightly tinged with yellow, and bright scarlet or yellow upon the upper side, where the white fragments of the vulva adhere closely to the smooth skin of the pileus.

* Annual report of the State Botanist of New York for 1894.

that is striate near the margin. Various stages in the development of this dangerous toadstool are shown from 1, the young "button" stage, to 6, the fully-developed specimen, in Figure 6.

The poisonous properties reside in an alkaloid called muscarine, which retards the action of the heart, followed by giddiness, cold sweat, lockjaw, stupor and death. Atropine, the active principle of belladonna (*Atropa Belladonna* L.), is an important heart stimulant

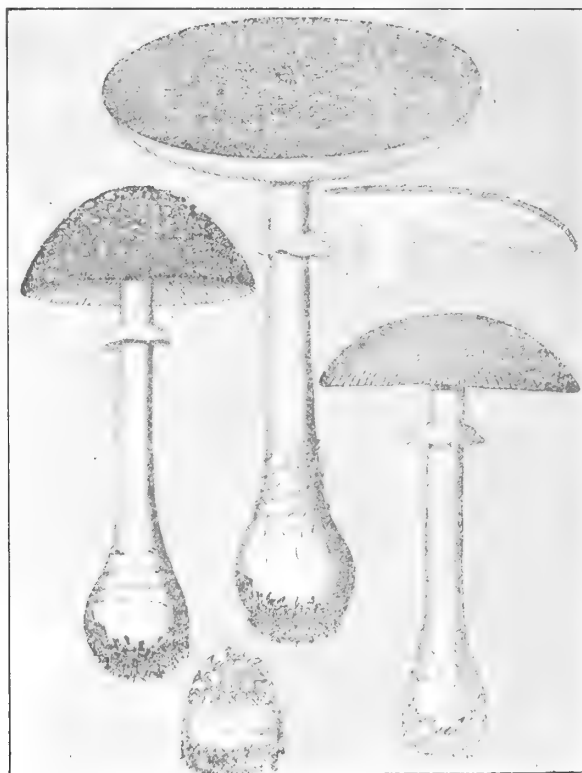


Fig. 6.

The Fly Amanita (*Amanita muscaria* L.)

that counteracts the action of the muscarine, and is given hypodermically in doses of one one-hundredth to one one-hundred-and-fiftieth of a grain. If possible, the undigested portions of the toadstool should be removed from the stomach and the lower intestines cleansed by a warm water enema. The case should be placed in the hands of a skilled physician at the earliest possible moment.

The poison amanita, or "death cup" (*Amanita phalloides* L.), is a very attractive toadstool, with a stem three to six inches long and half an inch thick, rising from an abrupt broad bulb surrounded by a cup narrowly margined at the top, distant from the stem and often notched or split. The satiny cap is three to five inches broad, destitute of warts and marginal striations, varying in color from white to

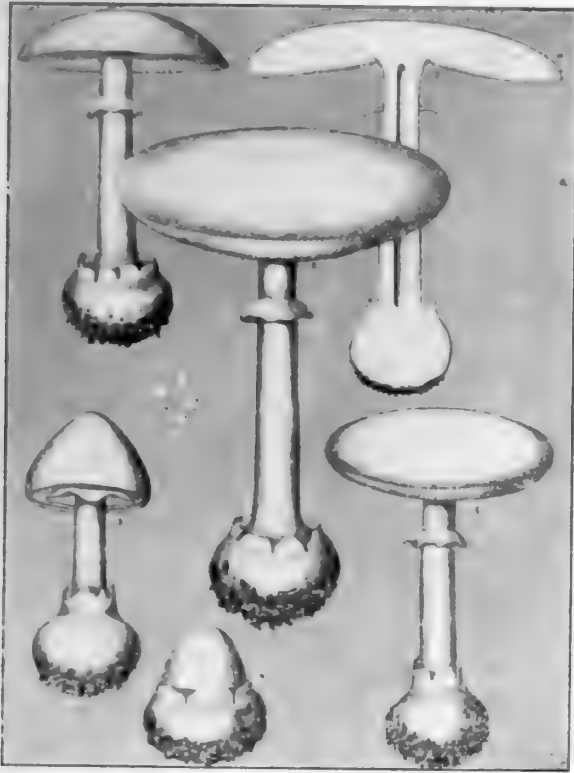


Fig. 7.

The Death Cup (*Amanita phalloides* L.)

brown, the white or yellowish being the common form. In those with grayish-brown color the center of the cap may become almost black. The color of the stem and collar follows that of the cap, with white prevailing. The gills are broad, rounded at and free from the stem. From 1 to 4, Figure 7, shows the stages in the development of this much to be dreaded toadstool.

This exceedingly poisonous toadstool is common in woods and pastures from July to October, and is the species most frequently causing death, which is due to phallin, that rapidly dissolves the blood corpuscles, when the serum escapes and the vitality is reduced. The symptoms of phallin-poisoning are slowly developed ; the pulse becomes weak, followed by nausea, diarrhoea and death after a few days. There is no antidote known for the poison of the "death cup," and all cases of it call for the skill of the best physicians. The removal of the toadstool from the system by emetics and enemas is of great importance at the outset.

The vernal amanita (*Amanita verna* Bull.) differs but little from the poison amanita, and may perhaps be regarded as a white variety, having the cup more closely surrounding the stem and extending somewhat above the bulbous base. This is shown in 5 to 7, Figure 7. While its European name indicates that it is a spring form of amanita, in the United States it does not appear before midsummer.

All three of the above toadstools have a conspicuous collar that surrounds the stalk an inch or so below the cap. They all likewise have the vulva ; but it must not be concluded that the presence of these parts is conclusive that the toadstool is poisonous or their absence that it is harmless. For example, there is the *Amanita cæsaræa* Scop., that while edible, has a red-orange cap with a conspicuous collar and cup. The common mushroom (*Agaricus campestris* L.) has the collar but no cup. The fact that this and many other species have no cup has led to the rule of looking with disfavor upon any with a cup.

The purpose here is to point out the characteristics of the most virulent species, and let these be known as forms to be avoided, and caution the reader to eat none but those, the wholesome properties of which are fully known, and the specimens are recognized by their specific characters in each instance. While the three Amanitas above described are the truly poisonous species, there are various others that will cause disarrangement of the stomach, nausea and vomiting, and should be avoided.

Dr. W. G. Farlow, in a recent paper,* after discussing at some length the leading edible and poisonous toadstools, draws up a summary from which the following rules are taken :

(1) Avoid fungi when in the button or unexpanded stage ; also those in which the flesh has begun to decay, even if only slightly.

* "Some Edible and Poisonous Fungi." Year Book of the United States Department of Agriculture, 1897.

(2) Avoid all fungi which have stalks with a swollen base surrounded by a sac-like or scaly envelope, especially if the gills are white.

(3) Avoid fungi having a milky juice, unless the juice is reddish.

(4) Avoid fungi in which the cap or pileus is thin in proportion to the gills, and in which the gills are nearly all of equal length, especially if the pileus is bright colored.

(5) Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish, and, in case of other tube-bearing fungi, experiment with caution.

(6) Fungi which have a sort of spider-web or flocculent ring around the upper part of the stalk should, in general, be avoided.

Ergot.

Ergot is very poisonous to the human subject, and in the Old World, in regions where rye is abundantly used for food, whole towns have been smitten with ergotism following a rye crop that was particularly infected with the fungus. In this country, where rye is less used as food, and with the modern, careful milling processes in vogue, there is usually no damage to man from the ergot of cereals. A tincture of ergot is one of the most powerful of the standard medicines and of great value.

PLANTS POISONOUS TO LIVE STOCK.

False hellebore (*Veratrum viride* Ait.) is a member of the lily family of plants, with large, plaited leaves clasping the tall stem, two to six feet high, bearing a terminal cluster of blossoms in early summer. Figure 8 (Plate III.) gives the appearance of this species, which resembles the other members of its family in all particulars, the roots being quite like those of a leek or onion, and is the portion containing the largest percentage of the toxic principle. It is often found in wet places, as lowland pastures, where it may be eaten by cattle. All parts of the plant contain the poisonous alkaloids, but they abound most largely in the root. In general effect the *Veratrum* is similar to aconite, and may paralyze the heart and spinal cord. Its cathartic nature is an advantage in that it tends to rid the victim of the poison.

Probably the majority of the injury done by this plant is to live stock, that feed upon the herbage and the roots somewhat, and therefore all plants of this species should be removed from pastures, especially where the ordinary harmless herbage is not abundant and the cattle are somewhat pressed for food.

Lamb-kill.

There are several plants of the heath family (Ericaceæ) that have a bad effect upon farm animals, many sheep and cattle being killed by them. The narrow-leaved laurel (*Kalmia angustifolia* L.) is a small evergreen shrub, with narrow leaves and clusters of pink five-angled flowers, borne some inches below the end of the branch. It is abundant in many parts of the State, particularly along sandy bogs, and from some of the common names the general nature of the plant may be inferred, for it is called both "sheep poison" and "lamb-kill." After having had only dry food through the winter, sheep are attracted by the evergreen leaves of the plant and eat it in considerable quantity, when otherwise they might be unharmed.

Poison Laurel.

A much larger species of the same genus as given above is the broad-leaved laurel (*Kalmia latifolia* L.), which, as a shrub, attains several feet in height, is nearly globular in shape, bearing large, shining evergreen leaves, and in June terminal clusters of showy, pink flowers, as shown in Figure 7 (Plate IV.), along with the shape of the glossy evergreen foliage. It is found along the banks of streams and rocky hillsides, and bears many common names, as "poison laurel," "sheep laurel," "mountain laurel" and "calico bush." It is mentioned here because of its ill effects upon live stock. Sheep, for example, after eating of it become nauseated, dizzy, followed by loss of sight, irregular breathing and in the worst cases, death.

The active principle andromedotoxin pervades the plant and is an exceedingly poisonous crystalline substance, having nearly the same toxic effects upon all creatures, but the fatalities are mostly among herbivorous animals. A case of poisoning with this plant coming under the writer's observation was due to wreaths of the laurel that had been thrown into a pasture from an adjoining cemetery in early spring, where the cows browsed upon them. Persons who make use of this plant for winter decorations should bear in mind its poisonous qualities. Fat of any sort, if given to animals in the early stages of the poisoning, is beneficial.

There are several other of the heath family that have toxic properties, as the "calf-kill" or "dog laurel" (*Leucothoe racemosa* L.), frequent in low grounds throughout the middle and southern coun-

ties of the State. The shrub resembles the high-bush huckleberry, with the flowers, in regular rows, appearing in June, followed by dry fruits instead of berries. Many fatal cases of poisoning of young stock are attributed to this species. A remedy mentioned for this poisoning is warm milk sweetened with molasses, which gives relief through vomiting.

The dog laurel or "branch ivy" (*Leucothoe Cutesbii* Walt.) is a common heath plant along streams, and shares with its relatives named above in the properties that render it poisonous to live stock. It is sometimes called "calf-kill."

Staggerbush.—Another toxic plant of the family is the "staggerbush" or "kill-lamb" (*Pieris Mariana* L.), frequent in moist land throughout the State.

The Rattle-box.

(*Crotalaria sagittalis* L.)

The rattle-box is a small annual plant of the pea family (Leguminosæ), and takes its name from the dry pod, an inch long, in which the brown, hard seeds rattle when the legume is shaken. It resembles a dwarf, much-branched, small-leaved pea plant, and is common in sandy places throughout the State.

The toxic principle of the crotalaria is unknown, but the plant has a peculiar effect upon farm animals, causing stupor, loud, heavy breathing, and death after many days. In the prairie States crotalism is not uncommon, but in New Jersey little is to be feared from it.

A plant of the same family, that produces a sort of intoxication in animals, is the loco weed (*Astragalus molissimus* Torr.), but as this does not grow in New Jersey, our stockmen may not expect to experience its peculiar effects in their herds.

Wild Cherry.

The three kinds of wild cherry common to the State, namely, wild black cherry (*Prunus serotina* Ehrh.), choke cherry (*Prunus Virginiana* L.) and the wild red cherry (*Prunus Pennsylvanica* L.) abound in prussic (hydrocyanic) acid, which is produced in nearly all portions of the plant, and particularly the leaves, bark and seeds. The leaves, of course, are the parts most frequently eaten by live stock. In a recent bulletin of the New Hampshire Experiment Station* the

*"Poisonous Properties of Wild Cherry Leaves," Messrs. Morse and Howard Bulletin No. 56, 1898.

following conclusions were reached : "The leaves of the wild black cherry are the most poisonous of the three species investigated, though all are dangerous. Both the wilted and fresh leaves are poisonous, while the dried are to be regarded with suspicion. Vigorous, succulent leaves from young shoots, which are the ones most liable to be eaten by cattle, are far more poisonous than the leaves from a mature tree or stunted shrub. Leaves wilted in bright sunlight to about 75 per cent. of original weight, or until they begin to appear slightly limp and to lose their gloss, yield the maximum amount of prussic acid."

The poisoned animal experiences "labored respiration, diminished pulse, numbness, fright, protruding eyeballs, convulsions and death from paralysis of the lungs. In some cases there is considerable frothing at the mouth ; in all, there is a very perceptible odor of prussic acid in the breath " (Chesnut).

From what has gone before, it is seen to be dangerous for cattle to forage at all freely upon the foliage of the wild black cherry, especially when placed within their reach by recently-felled trees, the leaves of which have become wilted.

Corn-cockle.

The grain fields quite generally contain more or less of the corn-cockle (*Agrostemma Githago* L.), an erect annual, with the violet-red flowers showing nearly even with the heads of grain and producing large capsules, with many black seeds. It is these seeds that are injurious, for they contain considerable poison, and if not separated from the associated grain in milling, they may cause much distress and even loss of life. In America the poisoning is generally confined to poultry, which feed upon the screenings of the wheat and other grain. Such a poisonous plant should be excluded from the seed-grain and the specimens pulled from the field before the poisonous seeds have had time to mature.

Paint Root.—The paint root (*Gyrotheca capitata* Walt.) grows abundantly in the lowlands of the southern counties of the State, and takes its common name from the abundance of orange juice in both the stems and the red roots. This plant is alleged to have a peculiar effect upon swine in the South, it killing white hogs, while black ones are exempt from its poisonous effects. It will be interesting to determine if any poisoning is experienced in our own State.

Cocklebur.—The cocklebur (*Xanthium strumarium* L.) has had many cases of death among swine attributed to it. The injuriousness may reside in the numerous barbed bristles that surround the seed, and when the burs are eaten they become compacted in the intestines similar to Hungarian grass with its matured awns, or the ripened husks of crimson clover when eaten by horses.

There are, however, instances upon record which indicate that, in addition to the impaction in the stomach, the cocklebur seed has strictly poisonous properties, reducing the action of the heart and causing death. At best, the cocklebur has no merit, it being a miserable, coarse weed, often covering neglected land to the exclusion of other vegetation, and should not be tolerated.

Cicuta.—The water hemlock (*Cicuta maculata* L.), treated upon page 4, when growing in the pasture, may be eaten by live stock, cattle and horses in particular, and cause serious sickness, and even death. It should be removed from such land by pulling the roots, or else the live stock prevented from getting to the poisonous plants. It is alleged that animals may be injured by drinking marsh water when the *Cicuta* abounds. Sickened animals are relieved by doses of melted lard, which retard the action of the poison.

Green Potatoes.—Recently the sickness of a herd of cattle was traced to the feeding of a quantity of potatoes that had been exposed to sunlight and were greened.

Sneezeweed.—The sneezeweed (*Helenium autumnale* L.) is a common plant of moist ground throughout the State, and it frequently poisons live stock and may prove fatal.

Somewhat Poisonous Plants.—The juniper (*Juniperus Virginiana* L.) may poison goats, which browse upon it. Seeds of sorrel (*Rumex acetosella* L.) are said to poison horses and sheep, and parsley (*Petroselinum sativum* L.) is sometimes injurious to birds, as also the berries of the trailing mahonia (*Berberis aquifolium* Pursh.) Buckwheat straw is considered as unwholesome, and the roots of hedge bindweed (*Convolvulus sepium* L.) quite poisonous to swine. The sandwort (*Arenaria serpyllifolia* L.) excites the salivary glands in horses, and the same is true of white and alsike clover.

Ergot.

Some of the fungi are poisonous to live stock, and in this respect the ergots are particularly to be noted. They are fungi (*Claviceps* sp.) that infest the heads of grains and many grasses and cause en-

largements, usually dark purple in color and as hard as horn. When in the heads of rye the sharp-pointed ergotted grains project like spurs upon a cock, thus giving a common name to this fungus, namely, "spurred rye." These grains contain a poisonous substance, ergotine, which may cause loss of extremities and even life when eaten by the animal. The ergot is most abundant upon low-land grasses and seldom to be dreaded in the Eastern States. In the West whole herds have experienced ergotism and been destroyed.

Should any trouble arise among live stock leading to suspicions, the veterinarian should, of course, be consulted at once. In such cases a careful examination of the maturing heads of standing grass or that of the hay might possibly give a clue to the cause of the trouble thus obtained.

Corn Smut.

The smut of corn and other grains has been suspected of doing injury to live stock, but from all the experiments that have been made no definite poisonous action of this fungus (*Ustilago Mays Zeae* DC.) has been demonstrated.

PLANTS POISONOUS TO THE TOUCH.

There are many plants that sensibly irritate the surface of the body of the human, but none is more familiar in these painful effects than the poison ivy (*Rhus radicans* L.) This is a climbing, perennial shrub, with trifoliate, compound leaves, somewhat like those of a strawberry plant. The small, greenish flower clusters appear in early summer, followed by waxy berries, that may cling to the vines through the winter.

This poison ivy grows generally throughout the State, and in some sections there is scarcely a stone wall or old fence that is not more or less covered with it. It can be quickly distinguished from the harmless woodbine, or Virginia creeper (*Parthenocissus quinquefolia* L.), often growing with it, by having three leaflets instead of five to each leaf, as in the latter vine. The poison ivy, or poison sumac, for it is of the sumac group of plants, has rootlets that are given off from the creeping stem, and by means of these it clings to the object of support, while the woodbine possesses short tendrils with discs at their tips for the organs of prehension. Figure 10 (Plate IV.) shows some of the details of the poison ivy.

All parts of the plant are pervaded with the poisonous principle,

and the juice is to be shunned by all not immune to its caustic effects. When in contact with the skin it produces an itching and burning that, if not relieved, results in watery blisters, that may run together and lift the epidermis over considerable areas.

Poison Sumac.

(*Rhus Vernix* L.)

Closely related to the poison ivy is another member of the genus *Rhus*, namely, the poison sumac. In appearance it is very different from the vine above considered, it being between a shrub and a tree, inhabiting swamps and moist woodland. The young growth is purple or red in early spring, and the leaves are long pinnate, with many leaflets, somewhat like some of the harmless sumacs that grow in the open, dry land.

This species of *Rhus*, often called "poison dogwood," "poison elder" and "poison wood," in different localities, is widespread throughout the Eastern United States, and is the leading venomous plant in this country. It produces the same burning sensation and blistering of the skin as the "vine," and to many persons it is more poisonous than the latter. The exact cause of the ill effects of the plant has been a matter of much conjecture; a volatile oil or acid, a gas or vapor, and even bacteria, have been assigned as the source of the violent irritation. It has been demonstrated within the past three years that the poison is a non-volatile oil, now named toxicodendrol. It pervades all parts of the tree, is insoluble in water, but is quickly dissolved by alcohol and saponified by alkalies. The isolated oil has been experimented with and its effects as to quantity and time of action studied by competent persons, who claim that weak alcohol (fifty per cent.), to which sugar of lead has been added to saturation, is the best remedy yet discovered. The fluid should be rubbed frequently upon the affected parts, when the itching subsides and the blisters cease spreading.

A knowledge of the nature of the poisonous element renders rational methods of treatment possible and confirms the reasonableness of some of those that have been in vogue. Since the writer was a small boy soft soap has been a remedy, and he has sometimes carried a cake of a hard variety of soap to use in washing hands and face at some pool or stream while upon botanical trips in ivy-infested regions. The alkali of the soap was the effective agent. A friend who is quite susceptible to the poison finds speedy and

complete relief in the application of hot water to the exposed parts. The exact action of the hot water upon the toxicodendrol is to be inferred, but, as a matter of fact, in one case at least it is a satisfactory remedy.

It has been taken for granted that the active principle in both of the poisonous plants of the *Rhus* genus in our flora is the same, and the remedy for the one is for both, namely, the weak alcohol bearing a full saturation of the sugar of lead. It should be remembered that this milky fluid is very poisonous when swallowed, and the bottle needs to be labeled, stored, and its contents used with special care.

Aside from the treatment of the poison, a word needs to be said concerning the eradication of the venomous plants. The poison sumac as it grows in swamps is not in the line of general travel, and excepting when in the vicinity of the house or pleasure grounds, will probably be left to itself. A few hours in the winter night, however, suffice to rid a low woodlot of the injurious plants. With the vine the case is quite different, for if left to thrive it will assert itself in many a hedge row and garden fence and neglected corners about the house. From all these it should be rooted out. As some persons are immune from the poison, such are specially endowed for this work of cleansing. All others will need to be upon their guard. The poison ivy roots deeply, and only thorough work will pay. Some use sulphuric acid upon the stumps, which, while effective, is exceedingly corrosive to the flesh and clothing of the operator.

Euphorbias.

The snow-on-the-mountain (*Euphorbia marginata* Pursh.) is a Western wild annual plant that is introduced into our ornamental grounds. Like the spurges generally, it is filled with a milky juice that produces an eruption, and blisters not unlike the effects from ivy-poisoning. The plant being unusually attractive from its white-margined leaves, children are apt to pick it and be poisoned thereby, while persons who use the plant in bouquets, etc., should be upon their guard.

The caper spurge (*Euphorbia Lathyris* L.) is a common cultivated plant, growing wild to some extent in the State. The milk is very irritating upon the skin, and may produce gangrene. Another garden spurge (*Euphorbia Cyparissias* L.) is likewise poisonous.

A rather common wild species of *Euphorbia*, the ipecac spurge (*E. Ipecacuanhæ* L.), growing in low tufts in sandy places and won-



FIG. 5.

The Poketoot (*Myrica deflexa* L.)



FIG. 6.

The Green Hellbore (*Podium villosum* Michx.)



Fig. 9.

The Poison Laurel (*Kalmia latifolia* L.)



Fig. 10.

The Poison Ivy (*Rhus radicans* L.)

derfully variable in size, shape and color of leaf and stem, has an abundance of milky juice that is quite irritating. The *Euphorbia corollata* L. is another species having the same effect.

Lady's Slippers.

Some of the orchids produce unpleasant effects, and the writer can share in this, for some years ago, having occasion to collect five hundred roots of the large lady's slipper (*Cypripedium reginae* Walt.), his hands became much inflamed and the poison finally extended to the face and eyes. At the time the trouble was assigned to the poison ivy, but since the careful investigation of Dr. MacDougal,* of the University of Minnesota, the orchid is credited with the cause of the particularly disagreeable experience.

The plants are provided with glandular hairs, containing a poisonous oil with an action similar to the toxicodendrol of the *Rhus radicans* L.

Other member of the genus, as the yellow lady's slipper (*C. hirsutum* Mill.) and small lady's slipper (*C. parviflorum* Salisb.), are likewise poisonous to the touch.

MANY SOMEWHAT POISONOUS PLANTS.

Among the trees the catalpa (*Catalpa Catalpa* L.) and ailanthus (*Ailanthus glandulosus* Desf.) produce emanations that are disagreeable and sometimes poisonous; the flowers of the former when handled will produce an irritation of the skin. A friend informs me that in working in osage orange (*Torylon pomiferum* Raf.) hedges he has suffered considerably, and when the thorn pierces the skin it leaves a poisoned wound. The generic name suggests toxic properties. The young leaves of the red cedar (*Juniperus Virginiana* L.) and arborvitae (*Thuja occidentalis* L.) are irritating to the skin and may even produce blisters, while the pitch of the spruce (*Picea Canadensis* Mill.) causes itching. Balm of Gilead (*Populus canadensis* Ait.), while having healing virtues, may also cause blistering. The green bark of the hercules club (*Aralia spinosa* L.) is irritating to the skin; the herbage of oleander (*Nerium Oleander* L.) affects some persons similar to poison ivy, while the bark of daphne (*Daphne Mezereum* L.) causes blisters, and the juice of the box (*Buxus sempervirens* L.) produces an itching with many persons.

* Bulletin No. 2, Part I, Minnesota Botanical Studies.

To some the herbage of the common Virginia bower (*Clematis Virginiana* L.) is acrid and unpleasant.

Many of the wild herbs have acrid properties, of which mention may be made of skunk cabbage (*Spathyema fetida* L.) and Indian turnip (*Arisæma triphyllum* L.), the latter with corms notoriously acrid and even producing inflammation of the skin. The leaves of cow parsnip (*Heracleum lanatum* Michx.) will produce blisters and several of the mustards (*Sinapis* sp.) are used for that purpose. The juice of the red pepper (*Capsicum annuum* L.) is irritating to the skin, and also that of the stonecrop (*Sedum acre* L.) Many can bear testimony to the inflammation brought on by handling the old-fashioned garden rue (*Ruta graveolens* L.), and the short bristles upon the borage (*Borago officinalis* L.) produce irritation. Some persons have the skin inflamed by handling the garden nasturtium (*Tropæolum majus* L.), and all seem to be poisoned by the *Mentzelia oligosperma* Nutt., one of the newer ornamental plants introduced from the far West. One of the indoor primroses (*Primula obconica* Hance) has irritating hairs quite poisonous to some persons, and the pimpernel (*Angallis arvensis* L.) is a closely-related suspect.

The meadow saffron (*Colchicum autumnale* L.) bulbs produce a pricking sensation, and garlic (*Allium* sp.) reddens the skin, while asparagus (*A. officinale* L.), of the same family, will sometimes blister the hands of those who work with it for a long time, and the same is true of green hellebore (*Veratrum viride* L.) Workers in celery sometimes have their hands swollen by it. Some species of greenhouse aloes are reported as causing inflammation.

The juice of the bloodroot (*Sanguinaria Canadensis* L.) will poison some who touch it, and the yellow juice of celandine (*Chelidonium majus* L.) acts in the same manner, not unlike the smartweeds (*Polygonum Hydropiper* L. and *P. punctatum* Ell.)

Some of the plants that poison when taken internally are not innocuous when touched. Thus the herbage of the poke (*Phytolacca decandra* L.), the monkshood (*Aconitum Napellus* L.) and larkspur (*Delphinium* sp.) cause a burning sensation. That of the baneberry (*Actæa alba* L.) belongs to the same family with the last two mentioned, and some of the buttercups are poisonous, the *Ranunculus sceleratus* L., celery-leaved buttercup, being one of the most virulent to the touch, while *R. acre* L. and *R. repens* L. are able to produce much irritation. Even their cousin, the windflower (*Anemone quinquefolia* L.) causes inflammation with some. A friend has been repeatedly poisoned by handling the star cucumber (*Sicyos angulatus* L.).

Among the sunflower family there are several that produce an itching sensation, as for example the beggar's tick (*Bidens frondosa* L.), fleabane (*Leptilon Canadense* L.), burdock (*Arctium Lappa* L.), the flowers of the common daisy (*Chrysanthemum leucanthemum* L.), while the Mayweed (*Anthemis cotula* L.) will sometimes blister the skin, in this exceeding the cockleburs (*Xanthium* sp.) The sneeze-weed (*Halenium autumnale* L.), as its name indicates, incites sneezing when its powder is inhaled. The corpse plant (*Monotropa uniflora* L.) is said to be poisonous.

It is not the purpose here to dwell upon the poisonous effects of plant products as they are passing through the factory. Thus flax-spinners have a flax poison and jute-workers a rash, hop-pickers a disagreeable inflammation of hands, while the grinders of mandrake root, for example, find the powder irritates the face. Hairy plants frequently annoy the people who handle them, as the mullein (*Verbascum thapsus* L.), but this is not the same as the inflammation that is produced by the ordinary field barley, for when an awn of this is drawn across the back of the hand or wrist it may leave a red line for hours.

The nettles are perhaps the best known of the common plants that produce an irritation of the skin. There are at least three species in the State, namely, *Urtica dioica* L., *Urtica urens* L., *Urtica gracilis* Ait., all of which, by means of their sharp hooked hairs, charged with a liquid, are able, in contact with the skin, to produce a sensation resembling the acute burning of a live coal. Growing near dwellings these weeds are often a source of much pain and they should be rooted out and destroyed. The wood nettle (*Urticastrum divaricatum* L.) is a near relative of the urticas and similar to them in producing the burning sensation.

The very unpleasant feature of the nettles and nettle-like plants is of so short duration that little need be said of remedies. Alcohol and laudanum have both been used with good results upon the affected parts.

Some of the toadstools are reported upon good authority as being somewhat poisonous to the touch, and especially the "death cup" and "fly amanita."

The list is by no means complete, but it is long enough to show that many plants possess properties that are able to produce effects when the irritating hairs or juice are brought in contact with the skin.

It is not unusual for persons who gather plants in field and forest

to receive sensations that are akin to those produced by mosquitoes, and at times when only the plants themselves are to be charged with causing the disagreeable effects.

Animals other than the human species are but little susceptible to the effects of the contact poisons. This is evidenced by farm animals eating without apparent harm the leaves and young twigs of the poison ivy. Creatures that can forage upon such material need not be expected to receive harm from the less-irritating poisons of the various plants mentioned above. And yet it is true that a person may be immune to ivy poison and suffer the usual discomfort from the nettles, and therefore it is not safe to make sweeping generalizations when the poisonous principle is not the same in the various plants that may produce unpleasant sensations when their juices are brought in contact with the skin.

The blistering action of the snow-on-the-mountain (*Euphorbia marginata* Pursh.) is so decided upon animals that "stock-raisers in Texas use the juice to brand cattle, it being held by them to be superior to a red-hot iron for that purpose, because the scars heal more satisfactorily" (Chesnut).

While finishing this bulletin a copy of Professor Chesnut's Farmers' Bulletin* reaches me. It considers only those of an undoubted poisonous nature, and the following is the list, with a statement as to which kinds are growing in New Jersey.

1. Fly amanita (*Amanita muscaria* L.) Yes.
2. Death cup (*Amanita phalloides* L.) Yes.
3. American false hellebore (*Veratrum viride* Ait.) Yes.
4. Pokeweed (*Phytolacca decandra* L.) Yes.
5. Corn-cockle (*Agrostemma Githago* L.) Yes.
6. Dwarf larkspur (*Delphinium tricornis* Michx.) No.
7. Wyoming larkspur (*Delphinium geyeri* Greene). No.
8. Purple larkspur (*Delphinium Menziesii* DC.) No.
9. Black cherry (*Prunus serotina* Ehr.) Yes.
10. Woolly loco weed (*Astragalus mollissimus* Torr.) No.
11. Stemless loco weed (*Spiesia Lamberti* (Pursh.) No.
12. Rattle-box (*Crotalaria sagittalis* L.) Yes.
13. Caper spurge (*Euphorbia Lathyris* L.) Yes.
14. Snow-on-the-mountain (*Euphorbia marginata* Pursh.) Yes.
15. Poison ivy (*Rhus radicans* L.) Yes.

* Farmers' Bulletin No. 86, "Thirty Poisonous Plants of the United States," by V. K. Chesnut, Assistant Botanist, U. S. Department of Agriculture, 1898.

16. Poison oak (*Rhus diversiloba* T. & G.) No.
17. Poison sumac (*Rhus Vernix* L.) Yes.
18. Red buckeyes (*Æsculus pavia* L.) ?
19. Water hemlock (*Cicuta maculata* L.) Yes.
20. Oregon water hemlock (*Cicuta vagans* Greene). No.
21. Poison hemlock (*Conium maculatum* L.) Yes.
22. Broad-leaf laurel (*Kalmia latifolia* L.) Yes.
23. Narrow-leaf laurel (*Kalmia angustifolia* L.) Yes.
24. Great laurel (*Rhododendron maxima* L.) Yes.
25. Staggerbush (*Pieris mariana* L.) Yes.
26. Branch ivy (*Leucothoë Cutesbæi* Walt.) Yes.
27. Jimson weed (*Datura Stramonium* L.) Yes.
28. Black nightshade (*Solanum nigrum* L.) Yes.
29. Bitter-sweet (*Solanum dulcamera* L.) Yes.
30. Sneezeweed (*Helenium autumnale* L.) Yes.

It is seen that we have all of the thirty except the three poisonous larkspurs of the Far-West, the two loco weeds of the Great Plains, the poison oak of the Pacific States, and the Oregon cicuta, not counting the red buckeye that is certainly not abundant with us.

OBSERVATIONS AND SUGGESTIONS.

Fatal cases of poisoning are usually among children, and in the spring of the year, when they go into the woods and fields with their taste sharpened for any green thing. There are many succulent roots that are harmless and are agreeable when eaten, and it is often through mistaken identity that the injury follows. If, for example, the cicuta is eaten instead of wild parsnip, conium for sweet cicely, or poke roots for artichokes, dire results may follow. In like manner distress may come from mistaking kalmia leaves for wintergreen, blue flag for sweet flag, or even hellebore leaves as a pot herb for marsh marigold. Again there is sometimes the element of bravery that leads to the partaking of poisonous plants, as when one child "dares" another and a false pride leads on possibly to death. There are sometimes the lurking vestiges of the savage in the child, and he takes a strange delight in "playing the Indian," particularly if hunger lends its impulse. In short, there are many reasons why our youth are led to forage somewhat indiscriminately upon the soft parts of plants, and against them all, the parent and teacher, and grown persons generally, should assist by advice and even reproof.

The majority of fatal cases have probably come from the eating of roots exposed by the excavations of earth where the poisonous plants abound, and it is here that the greatest care needs to be taken. Ditchers in low land where the cicuta, arisæma, iris, or veratrum is found or in high ground where the pokeroot may grow, need to warn children of the danger of feeding upon the fresh roots that are temptingly exposed.

The fruits stand next in order of dangerous parts of plants, and there is no better rule than to abstain from all that are not well known. Otherwise the sickening baneberries may be eaten or the still more poisonous green juicy fruits of the daturas may prove fatal.

Grown persons are most apt to be poisoned by the toadstools, and it is here repeated that only the kinds that are harmless and well known should be gathered. The poisonous species are too variable in characteristics to permit of taking any chances with them. It is better to limit one's list of edible kinds to a few quickly-recognized species than to extend the number at the risk of one's life. Finally, should a case of poisoning occur let the skilled physician be called at once, as the delay of an hour may result in death.

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